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Radiographic Views of Digestive Tracts of Rainbow Trout (*Oncorhynchus Mykiss*) and Mirror Carp (*Cyprinus Carpio*)

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Abstract

In this study, radiographic views of digestive tracts of rainbow trout [*Oncorhynchus mykiss* (Walbaum, 1792)] and mirror carp (*Cyprinus carpio* Linnaeus, 1758) were investigated. For this purpose, barium sulphate suspension was used as contrast agent. This agent was given into fish digestive tracts from the anus using a syringe. Then X-ray radiographs of fishes were taken. It was found that there were quite big differences between rainbow trout and mirror carp in term of structure of digestive tract. In comparison, digestive tract of rainbow trout is shorter because of possessing short intestine, anatomic stomach and pyloric caeca are present. However, digestive tract of mirror carp is very longer because of possessing long intestine and anatomic stomach is absent.

Keywords: Rainbow Trout, Oncorhynchus Mykiss, Mirror Carp, Cyprinus Carpio, Digestive Tract

Gökkuşağı Alabalığı (*Oncorhynchus Mykiss*) ve Aynalı Sazan (*Cyprinus Carpio*)'da Sindirim Kanalının Radyografik Görüntülenmesi

Özet

Bu çalışmada, gökkuşağı alabalığı [*Oncorhynchus mykiss* (Walbaum, 1792)] ve aynalı sazan (*Cyprinus carpio* Linnaeus, 1758)'da sindirim kanalının radyografik görünümleri incelendi. Bu amaçla, kontrast madde olarak baryum sülfat süspansiyonu kullanıldı. Bu madde bir şırınga yardımıyla anüsten sindirim kanalına verildi. Daha sonra balıkların X-ışını radyografileri alındı. Sindirim kanalı yapısı bakımından gökkuşağı alabalığı ve aynalı sazan arasında oldukça büyük fark olduğu tespit edildi. Yapılan karşılaştırmada, gökkuşağı alabalığı sindirim kanalının bağırsakların kısalığından dolayı daha kısa olduğu, anatomik mide ve plorik çekumların mevcut olduğu belirlendi. Buna karşılık, aynalı sazanda bağırsakların uzun olmasından dolayı sindirim kanalının da daha uzun olduğu ve anatomik midenin olmadığı görüldü.

Anahtar Kelimeler: Gökkuşağı Alabalığı, Oncorhynchus Mykiss, Aynalı Sazan, Cyprinus Carpio, Sindirim Kanalı.

1. Introduction

Fishes like other vertebrates need food for growth, physiological and chemical activities. Digestive system in fish consists of digestive tract, liver and pancreas. Liver and pancreas add enzymes and various chemicals as the food moves through the digestive tract. Digestive tract in fish mainly consists of mouth, pharynx, esophagus, stomach, intestines and anus. Fish ingest food through the mouth and break it down in the esophagus. In the stomach, food is further digested. The intestine completes the process of digestion and nutrient absorption. Lampreys, hagfishes, chimaeras, lungfishes and some teleost fish have no stomach at all, with the esophagus opening directly into the intestine. The small intestine is found in all bony fish, although its form and length vary enormously amongst fish species. The large intestine is the last part of the digestive system which normally found in vertebrate animals. However, in fish there is no true large intestine, but simply a short rectum connecting the end of the digestive part of the gut to the cloaca. Its function is to absorb water from the remaining indigestible food matter, and then to pass useless waste material from the body [1-5].

In general, there is a relationship between feeding habits and the structure of digestive system in fish. It is a fact that fishes have a large variety of feeding habitats and also have different structure of the digestive tract [3-5].

In the present study, radiographic views of digestive tracts of rainbow trout (*Oncorhynchus mykiss*) and mirror carp (*Cyprinus carpio*) were aimed.

2. Materials and Methods

In this study two different fish species (rainbow trout and mirror carp), that have the economic value and are commonly cultured, were used. They were obtained from fish market of Elazığ City as live and transferred to an aquarium in Firat University Fisheries Faculty. They were fasted for 3 days for removing the gastrointestinal contents and then anesthetised with Quinidine solution (50 ppm) for 2 minutes. Fishes were dried with a towel and barium sulphate (%100w/v) as contrast agent was given to fish digestive tract from the anus using a syringe. Then X-ray radiographs of fish were taken with Röntgenwerk-Bochum and automatically bathed with Protec-45.

3. Results and Discussion

Radiographs of digestive tracts of rainbow trout and mirror carp are given in Figure 1.

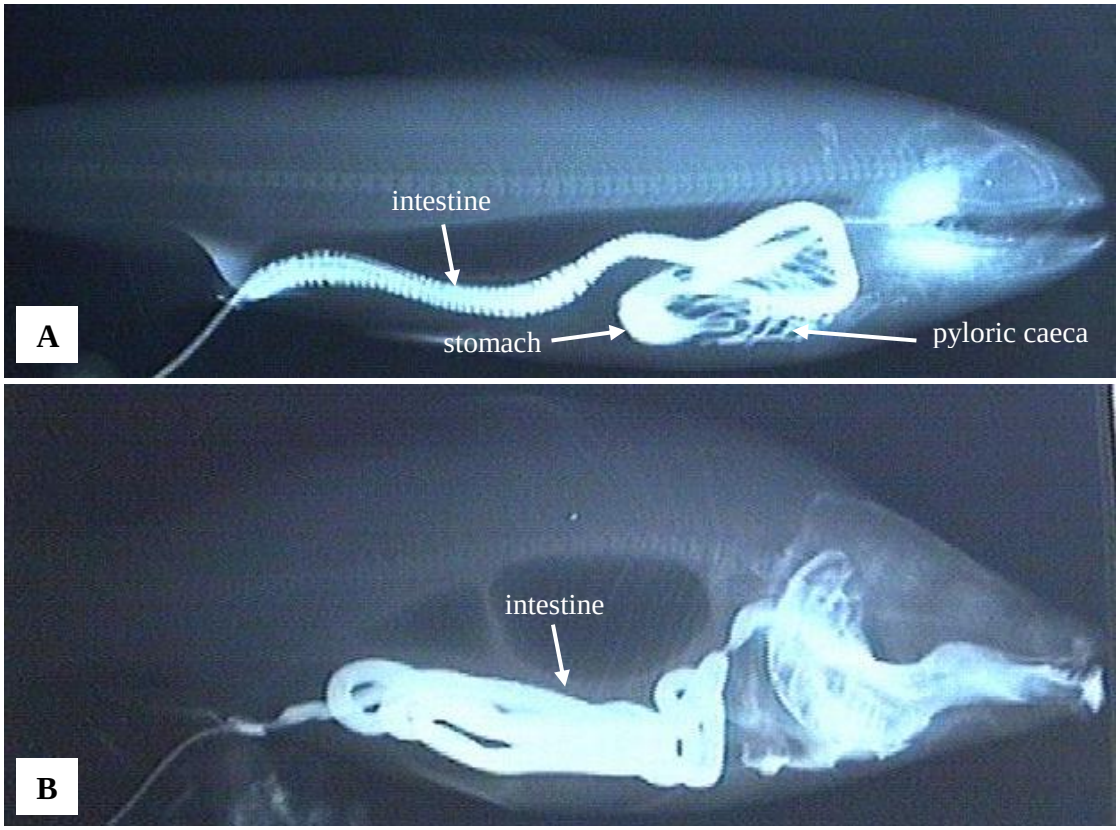

Figure 1. Radiographic views of digestive tract of rainbow trout (A) and mirror carp (B)

Previous researches have been stated that digestive system of a fish shows more or less difference from that of others. It also showed that in fish there are a close relationship between the structure of digestive system and feeding habits [1, 3-6].

According to radiographic views of digestive tract, there are more differences between rainbow trout and mirror carp in term of structure of digestive tract (Figure 1). In comparison, in rainbow trout digestive tract is shorter because of possessing short intestine, anatomic stomach and pyloric caeca are present.

However, in mirror carp digestive tract is longer because of possessing long intestine and anatomic stomach is absent. These two fish species also have different feeding habits. Rainbow trout is a carnivorous feeder, certainly feed on other small animals. Whereas mirror carp is an omnivorous feeder, feed on both plants and animals. In general, digestive tract of carnivorous feeders is shorter than that of omnivorous and herbivorous feeders [1, 4-6]. The result of the present study showed similarity with this general statement mentioned above.

In conclusion, the structure of digestive system shows some differences according to fish species. Most researchers found that this differences are not only on anatomic structures, but also on histological structures and enzymatic activities.

4. References

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